REMARKS

The Office Action dated November 2, 2007 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 4, 5, 8-13, 15-18 and 24-27 have been amended to more particularly point out and distinctly claim the subject matter which is the invention. Claims 2 and 14 have been cancelled. No new matter has been added. Claims 1, 3-5, 8-13, 15-18 and 24-27 are submitted for consideration.

Claims 8, 10-11, 13, 14 and 24-27 were rejected under 35 U.S.C. 101 on the grounds that the claimed invention is directed to non-statutory subject matter. The rejection is traversed. Paragraph 0003 of the present specification, discloses that a computer node is defined as an entity provided with a dedicated processor, memory, and operating system, as well as with a network interface through which it can communicate with other computer nodes of a computer cluster/computer network. Thus, using this definition, all network servers or routers, for example even the servers of the cited prior art, could also be called computer nodes. If the position taken in the Office Action is applied to all applications, most networking devices would be unpatentable, which is not the case. Thus, Applicants submit that a computer node, as recited in the pending claims, is statutory subject matter under 35 U.S.C. 101 and request that this rejection be withdrawn.

Claims 8, 10-11, 13, 14 and 24-27 were rejected under 35 U.S.C. 101 on the grounds that the modules in the claims are "configured to" perform a function, but no function is actually required. As noted in section 2111.04 of the MPEP, the determination of whether a clause is a limitation in a claim depends on the specific facts. The "configured to" clauses of the pending claims do not suggest or make optional the functions performed by modules in the claims. Instead, the "configured to" clauses of the pending claims indicate that the modules are created to perform these functions which are required limitations of the pending claims. Therefore, unlike what is alleged in the Office Action, the pending claims recite functions that are required by the modules. Based on the arguments presented above, Applicants request that the rejections under 35 U.S.C. 101 be withdrawn.

Claims 1, 2, 4, 5, 8, 14, 15, 18, 24, 25, 26 and 27 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 1, 2, 4, 5, 8, 14, 15, 18, 24, 25, 26 and 27 have been amended to overcome the rejection. Therefore, Applicants request that the rejection be withdrawn.

Claims 1-5, 8-18 and 24-27 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,035,918 to Redding (hereinafter Redding). The rejection is traversed as being based on a reference that does not teach or suggest each of the elements of pending claims.

Claim 1, upon which claims 3-5 depend, recites a method including receiving, in at least one second computer node of a computer network, periodic heartbeat messages

Application No.: 10/630,972

from a first computer node of the computer network. The second computer node includes at least one resource for performing at least one network-specific task. The method also includes transmitting heartbeat acknowledgement messages from the second computer node to the first computer node as responses to the heartbeat messages. Each heartbeat acknowledgement message indicates to the first computer node that the second computer node is operative within the computer network and the heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages transmitted from the second computer node to the first computer node. The method also includes examining, in the second computer node, whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the first computer node, the heartbeat acknowledgement message belonging to the sequence of heartbeat messages and the state information being indicative of current ability of the at least one resource to perform the at least one network-specific task. The method further includes retrieving the state information for the heartbeat acknowledgement message when the examining indicates that the state information is to be retrieved and sending the retrieved state information in the heartbeat acknowledgement messages to the first computer node for storing the state information in the first computer node. The examining is performed for each heartbeat acknowledgement message to be transmitted to the first computer node, thereby transferring a sequence of the state information within the sequence of heartbeat acknowledgement messages.

Claim 8, upon which claims 9-12 depend, recites a computer network including a

Application No.: 10/630,972

plurality of computer nodes. The computer network also includes a second computer node of the plurality of computer nodes including a receiving unit configured to receive periodic heartbeat messages from a first computer node of the plurality of computer nodes. The second computer node also includes at least one resource for performing at least one network-specific task. The second computer node further includes a transmitting unit configured to transmit heartbeat acknowledgement messages to the first computer node as responses to the heartbeat messages. Each heartbeat acknowledgement message indicates to the first computer node that the second computer node is operative within the computer network and the heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages. The transmitting unit includes an examining unit configured to examine whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the first computer node. The heartbeat acknowledgement message belongs to the sequence of heartbeat acknowledgement messages and the state information is indicative of current ability of the at least one resource to perform the at least one network-specific task. The transmitting unit further includes a retrieving unit configured to retrieve, upon indication by the examining unit, the state information for the heartbeat acknowledgement message. The transmitting unit also includes a sending unit, responsive to the retrieving unit, configured to send the retrieved state information in the heartbeat acknowledgement message to the first computer node for the first computer node to store the state information for managing the computer network. The examining unit is configured to operate for each heartbeat acknowledgement message to be transmitted to the

Application No.: 10/630,972

first computer node, thereby transferring a sequence of the state information within the sequence of heartbeat acknowledgement messages.

Claim 13 recites a computer node including at least one resource for performing at least one network-specific task and a receiving unit configured to receive a periodic heartbeat message from another computer node. The computer node also includes a transmitting unit configured to transmit heartbeat acknowledgement messages to the other computer node as responses to the periodic heartbeat messages. Each heartbeat acknowledgement message indicates to the other node that the computer node is operative within the computer network. The heartbeat messages form a sequence of heartbeat acknowledgement messages. The transmitting unit includes an examining unit configured to examine whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the other computer node, the heartbeat acknowledgement message belonging to the sequence of heartbeat acknowledgement messages and the state information being indicative of current ability of the at least one resource to perform the at least one network-specific task. The transmitting unit further includes a retrieving unit configured to retrieve, upon indication by the examining unit, state information for the heartbeat acknowledgement message and a sending unit, responsive to the retrieving unit, configured to send the retrieved state information in the heartbeat acknowledgement message to the other computer node. The examining unit is configured to operate for each heartbeat acknowledgement message to be transmitted to the other computer node, thereby transferring a sequence of the state information within the sequence of heartbeat

Application No.: 10/630,972

acknowledgement messages to the other computer node.

Claim 15, upon which claims 16-18 depend, recites a method including transmitting periodic heartbeat messages from a first computer node of a computer network to a second computer node of the computer network, the second computer node including at least one resource for performing at least one network-specific task. The method also includes receiving, in the first computer node, heartbeat acknowledgement messages from the second computer node as responses to a heartbeat message. The heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages and each heartbeat acknowledgement message of the sequence indicates to the first computer node that the second computer node is operative within the computer network. The method further includes examining, in the first computer node, whether a heartbeat acknowledgement message includes state information indicative of current ability of the at least one resource to perform the at least one network-specific task. The heartbeat acknowledgement message is any of the heartbeat acknowledgement messages of the sequence. The method also includes storing the state information for managing the computer network.

Claim 24 recites a computer node including a transmitting unit configured to transmit periodic heartbeat messages to a second computer node of a computer network, the second computer node including at least one resource for performing at least one network-specific task. The computer node also includes a receiving unit configured to receive heartbeat acknowledgement messages from the second computer node as responses to the

Application No.: 10/630,972

heartbeat messages. The heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages and each heartbeat acknowledgement message of the sequence indicates that the second computer node is operative within the computer network. The computer node further includes an examining unit configured to examine whether a heartbeat acknowledgement message includes state information indicative of an ability of the at least one resource to perform the at least one network-specific task. The heartbeat acknowledgement message is any of the heartbeat acknowledgement messages of the sequence. The computer node also includes a storing unit configured to store the state information for managing the computer network.

Claim 25 recites a computer network including a plurality of computer nodes and receiving means for receiving periodic heartbeat messages from a first computer node of the computer network in a second computer node of the computer network. The second computer node includes at least one resource for performing at least one network-specific task. The computer network also includes transmission means in the second computer node for transmitting heartbeat acknowledgement messages to the first computer node as responses to the heartbeat messages. Each heartbeat acknowledgement message indicates to the first computer node that the second computer node is operative within the computer network and the heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages. The transmission means includes examining means for examining whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the first computer node. The heartbeat acknowledgement

Application No.: 10/630,972

message belongs to the sequence of heartbeat acknowledgement messages and the state information is indicative of current ability of the at least one resource to perform the at least one network-specific task. The transmission means also includes retrieving means for retrieving, upon indication by the examination means, state information for the heartbeat acknowledgement message; and sending means, responsive to the retrieving means, for sending the retrieved state information in the heartbeat acknowledgement message to the first computer node for storage of the state information on the first computer node. The examining means are configured to operate for each heartbeat acknowledgement message to be transmitted to the first computer node, thereby transferring a sequence of the state information within the sequence of heartbeat acknowledgment messages.

Claim 26 recites a computer node including at least one resource for performing at least one network-specific task and receiving means for receiving periodic heartbeat messages from another computer node. The computer node also includes transmission means for transmitting heartbeat acknowledgement messages to the other computer node as responses to the periodic heartbeat messages. Each heartbeat acknowledgement message indicates to the other computer node that the computer node is operative within a computer network and the heartbeat messages form a sequence of heartbeat acknowledgement messages. The transmission means includes examining means for examining whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the other computer node. The heartbeat acknowledgement message belongs to the sequence of heartbeat acknowledgement messages and the state information is indicative of current

Application No.: 10/630,972

ability of the at least one resource to perform the at least one network-specific task. The transmission means also includes retrieving means for retrieving, upon indicating by the examining means, the state information for the heartbeat acknowledgement messages and sending means, responsive to the retrieving means, for sending the retrieved state information in the heartbeat acknowledgement message to the other computer node. The examining means are configured to operate for each heartbeat acknowledgement message to be transmitted to the other computer node, thereby transferring a sequence of the state information within the sequence of heartbeat acknowledgment messages.

Claim 27 recites a computer node including transmitting means for transmitting periodic heartbeat messages to at least one second computer node of a computer network. The second computer node includes at least one resource for performing at least one network-specific task. The computer node also includes reception means for receiving heartbeat acknowledgement messages from the at least one second computer node as responses to the heartbeat messages. The heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages and each heartbeat acknowledgement message indicates that the second computer node is operative within the computer network. The computer node further includes examining means for examining whether a heartbeat acknowledgement messages includes state information indicative of current ability of the at least one resource to perform the at least one network-specific task. The heartbeat acknowledgement message is any of the heartbeat acknowledgement messages of the sequence. The computer node includes storing means for storing the state information for

Application No.: 10/630,972

managing the computer network.

As outlined below, the cited reference of Redding does not teach or suggest each of the elements of the pending claims.

Redding discloses a system and process involving a pool of license servers for managing licenses to one or more protected software programs, files or other data structures, among one or more users on the network. Protected software may include a software program, such as a word-processing program, a graphics program, a computer game, a proprietary file or other data structure, such as a database or other form of data, as well as, other software encoded information or instructions, for which the control of user access is desired. In an embodiment of the Redding, a plurality of license servers are managed in accordance with a server pool scheme, which is discussed in more detail below.

Applicants submit that Redding does not teach or suggest each of the elements of the pending claims. Each of independent claims 1, 8, 13, 15 and 24-27, in part, recites receiving heartbeat acknowledgement messages from the second computer node as responses to a heartbeat message, the heartbeat acknowledgement messages form a sequence of heartbeat acknowledgement messages and each heartbeat acknowledgement message of the sequence indicates to the first computer node that the second computer node is operative within the computer network. Each of independent claims 1, 8, 13, 15 and 24-27 also recites examining, in the first computer node, whether a heartbeat acknowledgement message includes state information indicative of current ability of the at least one resource to perform at least one network-specific task. Redding does not teach or suggest these

Application No.: 10/630,972

features.

Redding discloses a license management system including client computers and a pool of license servers. The problem underlying the Redding invention is that in license management systems, each license server operates somewhat independent of other license servers. Redding, therefore, seeks to accomplish a more flexible system to be able to more efficiently manage licenses on a network level. Particularly, Redding seeks to accomplish a system in which a client may receive a new authorization from a new license server, if the license server that previously issued the authorization is no longer in service.

In Redding, the client computers request authorizations from the license servers to use protected software. A pool of license servers, which include a leader server and at least one follower server, manages the distribution of allocations to the protected software. Each follower server is programmed to manage its distribution of allocations and to communicate the status of its allocations to the leader server. Consequently, the leader server always has a global picture of the current distribution of allocations within every license server in the server pool. In contrast, each follower server keeps track of only changes to its own allocations, that is, the follower servers do not keep track of changes to the allocations of other license servers. The leader server periodically sends heartbeat messages to the follower servers, the heartbeat messages including server identification information. If the leader server does not receive an acknowledgement message from a particular follower server in response to the heartbeat message within an expected period of time, the leader server will designate that follower server as

Application No.: 10/630,972

being out of service.

Redding also discloses that if a follower server does not receive a heartbeat message from the leader server within an expected period of time, it sends a check message to the leader server to check if the leader server is still in service. If the leader server is in service, it will send an acknowledgement message in response to the check message. If no acknowledgement message is received, the follower server will start a leader selection process to select a new leader server. When a new leader server has been selected, the new leader server obtains the above-mentioned global picture of the current distribution of allocations within every license server in the server pool. In particular, when the new leader server starts to send the heartbeat messages, a follower server detects, from the server identification information contained in the heartbeat message, that the leader server has changed. The follower server then sends an acknowledgement message to the new leader server, and in the process, the follower server provides information on its own allocations to the new leader server. See Col. 10, line 30-Col. 11, line 59.

The Office Action alleged that the disclosure of Col. 11, lines 35-49 of Redding is equivalent to the features of the pending claims. The cited sections of Redding disclose that upon detecting a new leader server, a follower server sends information about its own allocations to the new leader server. Applicants submit that these features of Redding are different from the basic idea of the present invention.

Application No.: 10/630,972

The pending claims, in part, recite examining whether state information is to be retrieved for a heartbeat acknowledgement message to be transmitted to the first computer node, the heartbeat acknowledgement message belonging to the sequence of heartbeat messages and the state information being indicative of current ability of the at least one resource to perform the at least one network-specific task. The pending claims also recite retrieving the state information for the heartbeat acknowledgement message when the examining indicates that the state information is to be retrieved and sending the retrieved state information in the heartbeat acknowledgement messages to the first computer node for storing the state information in the first computer node. Redding does not teach or suggest using the intrinsic heartbeat mechanism of a computer cluster for collecting state information from the computer nodes. Redding does not teach or suggest these features.

In Redding, the allocations of the follower server are sent to the leader server in response to a fault situation, that is, when the leader server goes down and a new server is executed. Furthermore, Redding does not teach or suggest sending the state information in the heartbeat acknowledgement message. Instead, Redding simply states that the information is sent to the leader server upon detection of the change of the leader server. Obviously, in Redding, the information is sent in one or more separate message(s) after the sending of the acknowledgement message. Therefore, Redding only discloses that the heartbeat mechanism is used to detect if the leader server changes. Redding only employs the conventional heartbeat mechanism for examining the identity of the sending party,

Application No.: 10/630,972

which is always included in a heartbeat message, and thus, to detect if the leader server has changed.
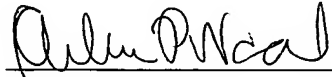
Redding also does not suggest employing the sequence of heartbeat acknowledgement messages for collecting data indicative of the ability of the cluster resources to perform cluster-specific tasks, as recited in the pending claims. Based on the distinctions noted above, Applicants assert that the rejection under 102(e) should be withdrawn because Redding does not teach or suggest each of the elements of claims 1, 8, 13, 15 and 24-27. Applicants submit that because claims 3-5, 9-12 and 16-18 depend from claims 1, 8, 13, 15 and 24-27, claims 3-5, 9-12 and 16-18 are allowable at least for the same reasons as claims 1, 8, 13, 15 and 24-27, as well as for the additional features recited in claims 3-5, 9-12 and 16-18.

As noted previously, claims 1, 3-5, 8-13, 15-18 and 24-27 recite subject matter which is neither disclosed nor suggested in the prior art references cited in the Office Action. It is therefore respectfully requested that all of claims 1, 3-5, 8-13, 15-18 and 24-27 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

Application No.: 10/630,972

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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